

**WHAT IS CLAIMED IS:**

- 1        1. A method of establishing bi-directional connectivity of a network
- 2        element in a network, the method comprising:
  - 3            receiving a first unreliable packet from said network element;
  - 4            storing an address of said network element in a neighbor pending list;
  - 5            sending a reliable packet to said network element; and
  - 6            if an acknowledgement to said reliable packet is received from said network
  - 7            element,
  - 8            accepting said network element as a neighbor.

1                   2.       The method of claim 1, wherein said unreliable packet does not require  
2                   a response.

1                   3.     The method of claim 1, wherein said reliable packet requires a  
2     response.

1                  4.         The method of claim 1, wherein said accepting said network element  
2 as neighbor is done by moving said address of said network element from said  
3 neighbor pending list to a neighbor list.

1           5.       The method of claim 4, further comprising:  
2            if said address of said network element is in said neighbor list,  
3            updating a neighbor hold count for said network element.

1           6.       The method of claim 1, further comprising:  
2           determining if said address of said network element is in a dampening list.

1           7.       The method of claim 6, further comprising:  
2            if said address of said network element is in said dampening list,  
3            updating a value of a reliability count of said network element to  
4            reflect higher reliability of said network element.

1       8.     The method of claim 7, further comprising:  
2        if said value of said reliability count is a maximum value,  
3        moving said address of said network element from said dampening list  
4        to said neighbor pending list.

1       9.     The method of claim 8, wherein said maximum value is predetermined.

1       10.    The method of claim 8, wherein said maximum value is dynamically  
2       adjusted according to a traffic condition in said network.

1       11.    The method of claim 6, further comprising:  
2        if said network element is not in said dampening list,  
3        adding said address of said network element to said dampening list,  
4        and  
5        setting said value of said reliability count of said network element to  
6        said maximum value.

1       12.    The method of claim 11, further comprising:  
2        setting said neighbor hold count for said network element; and  
3        sending a second unreliable packet to said network element.

1       13.    The method of claim 1, further comprising:  
2        initiating a neighbor pending timer.

1       14.    The method of claim 12, further comprising:  
2        if said acknowledgement to said reliable packet is not received before said  
3        neighbor pending timer expires,  
4        removing said address of said network element from said neighbor  
5        pending list, and  
6        updating said value of said reliability count to reflect lower reliability  
7        of said network element.

1       15. The method of claim 12, further comprising:  
2       if said acknowledgement to said reliable packet is received before said  
3       neighbor pending timer expires,  
4       moving said address of said network element from said neighbor  
5       pending list to said neighbor list, and  
6       removing said address of said network element from said dampening  
7       list.

1       16. A system for establishing bi-directional connectivity with a network  
2       element in a network comprising:  
3       a central processing module; and  
4       a neighbor pending list coupled to said central processing module, wherein  
5       said central processing module is configured to store an address of said  
6       network element in said neighbor pending list while said network  
7       element is in a process of establishing said bi-directional connectivity  
8       with said system.

1       17. The system of claim 16, further comprising:  
2       an input-output module coupled to said central processing module, wherein  
3       said input-output module is configured to provide input-output  
4       interface to said central processing module; and  
5       a counter module coupled to said central processing module, wherein said  
6       counter module is configured to provide at least one of timing and  
7       counting functionality to said central processing module.

1       18. The system of claim 16, further comprising:  
2       a neighbor list coupled to said central processing module, wherein said  
3       neighbor list is configured to store said address of said network  
4       element after said bi-directional connectivity is established with said  
5       network element; and  
6       a dampening list coupled to said central processing module, wherein said  
7       dampening list is configured to store said address of said network  
8       element when a value of a reliability count in said counter module is  
9       lower than a maximum value.

1       19. The system of claim 18, wherein said maximum value is  
2       predetermined.

1       20. The system of claim 18, wherein said maximum value is dynamically  
2       adjusted according to a traffic condition in said network.

1       21. A network device comprising:  
2       a processor; and  
3       a network interface coupled to said processor, said processor is configured to  
4       receive a first unreliable packet from said network element,  
5       store an address of said network element in a neighbor pending list,  
6       send a reliable packet to said network element, and  
7       if an acknowledgement to said reliable packet is received from said  
8       network element,  
9       accept said network element as a neighbor.

1       22. The network device of claim 21, wherein said unreliable packet does  
2       not require a response.

1       23. The network device of claim 21, wherein said reliable packet requires a  
2       response.

1        24. The network device of claim 21, wherein said accepting said network  
2 element as neighbor is done by moving said address of said network element from  
3 said neighbor pending list to a neighbor list.

1        25. The network device of claim 24, wherein said processor is further  
2 configured to  
3            if said address of said network element is in said neighbor list,  
4                update a neighbor hold count for said network element.

1        26. The network device of claim 21, wherein said processor is further  
2 configured to  
3            determine if said address of said network element is in a dampening list.

1        27. The network device of claim 26, wherein said processor is further  
2 configured to  
3            if said address of said network element is in said dampening list,  
4                update a value of a reliability count of said network element to reflect  
5                higher reliability of said network element.

1        28. The network device of claim 27, wherein said processor is further  
2 configured to  
3            if said value of said reliability count is a maximum value,  
4                move said address of said network element from said dampening list to  
5                said neighbor pending list.

1        29. The network device of claim 28, wherein said maximum value is  
2 predetermined.

1        30. The network device of claim 28, wherein said maximum value is  
2 dynamically adjusted according to a traffic condition in said network.

1       31. The network device of claim 6, wherein said processor is further  
2 configured to  
3       if said network element is not in said dampening list,  
4           add said address of said network element to said dampening list, and  
5           set said value of said reliability count of said network element to said  
6           maximum value.

1       32. The network device of claim 31, wherein said processor is further  
2 configured to  
3       set said neighbor hold count for said network element; and  
4       send a second unreliable packet to said network element.

1       33. The network device of claim 31, further comprising:  
2       initiate a neighbor pending timer.

1       34. The network device of claim 32, wherein said processor is further  
2 configured to  
3       if said acknowledgement to said reliable packet is not received before said  
4           neighbor pending timer expires,  
5           remove said address of said network element from said neighbor  
6           pending list, and  
7           update said value of said reliability count to reflect lower reliability of  
8           said network element.

1       35. The network device of claim 32, further comprising:  
2       if said acknowledgement to said reliable packet is received before said  
3           neighbor pending timer expires,  
4           move said address of said network element from said neighbor pending  
5           list to said neighbor list, and  
6           remove said address of said network element from said dampening list.

1       36. A network device comprising:  
2       means for receiving a first unreliable packet from said network element;  
3       means for storing an address of said network element in a neighbor pending  
4       list;  
5       means for sending a reliable packet to said network element; and  
6       means for accepting said network element as a neighbor if an  
7       acknowledgement to said reliable packet is received from said  
8       network element.

1       37. The network device of claim 36, wherein said unreliable packet does  
2       not require a response.

1       38. The network device of claim 36, wherein said reliable packet requires a  
2       response.

1       39. The network device of claim 36, wherein said accepting said network  
2       element as neighbor is done by moving said address of said network element from  
3       said neighbor pending list to a neighbor list.

1       40. The network device of claim 39, further comprising:  
2       means for updating a neighbor hold count for said network element if said  
3       address of said network element is in said neighbor list.

1       41. The network device of claim 36, further comprising:  
2       means for determining if said address of said network element is in a  
3       dampening list.

1       42. The network device of claim 41, further comprising:  
2       means for updating a value of a reliability count of said network element to  
3       reflect higher reliability of said network element if said address of said  
4       network element is in said dampening list.

1       43. The network device of claim 42, further comprising:  
2       means for moving said address of said network element from said dampening  
3       list to said neighbor pending list.

1       44. The network device of claim 43, wherein said maximum value is  
2       predetermined.

1       45. The network device of claim 43, wherein said maximum value is  
2       dynamically adjusted according to a traffic condition in said network.

1       46. The network device of claim 41, further comprising:  
2       means for adding said address of said network element to said dampening list  
3       if said network element is not in said dampening list, and  
4       means for setting said value of said reliability count of said network element  
5       to said maximum value if said network element is not in said  
6       dampening list.

1       47. The network device of claim 46, further comprising:  
2       means for setting said neighbor hold count for said network element; and  
3       means for sending a second unreliable packet to said network element.

1       48. The network device of claim 36, further comprising:  
2       initiating a neighbor pending timer.

1       49. The network device of claim 47, further comprising:  
2       means for removing said address of said network element from said neighbor  
3       pending list if said acknowledgement to said reliable packet is not  
4       received before said neighbor pending timer expires, and  
5       means for updating said value of said reliability count to reflect lower  
6       reliability of said network element if said acknowledgement to said  
7       reliable packet is not received before said neighbor pending timer  
8       expires.

1       50. The network device of claim 47, further comprising:  
2       means for moving said address of said network element from said neighbor  
3       pending list to said neighbor list if said acknowledgement to said  
4       reliable packet is received before said neighbor pending timer expires,  
5       and  
6       means for removing said address of said network element from said  
7       dampening list if said acknowledgement to said reliable packet is  
8       received before said neighbor pending timer expires.

1       51. A computer program product for establishing bi-directional  
2       connectivity of a network element in a network, encoded in computer readable media,  
3       said program product comprising a set of instructions executable on a computer  
4       system, said set of instructions configured to  
5       receive a first unreliable packet from said network element;  
6       store an address of said network element in a neighbor pending list;  
7       send a reliable packet to said network element; and  
8       if an acknowledgement to said reliable packet is received from said network  
9       element,  
10      accept said network element as a neighbor.

11       52. The computer program product of claim 51, wherein said unreliable  
12      packet does not require a response.

1       53. The computer program product of claim 51, wherein said reliable  
2       packet requires a response.

1       54. The computer program product of claim 51, wherein said accepting  
2       said network element as neighbor is done by moving said address of said network  
3       element from said neighbor pending list to a neighbor list.

1        55. The computer program product of claim 4, wherein said set of  
2 instructions is further configured to:

3                if said address of said network element is in said neighbor list,  
4                        update a neighbor hold count for said network element.

1        56. The computer program product of claim 51, wherein said set of  
2 instructions is further configured to:

3                determine if said address of said network element is in a dampening list.

1        57. The computer program product of claim 56, wherein said set of  
2 instructions is further configured to:

3                if said address of said network element is in said dampening list,  
4                        update a value of a reliability count of said network element to reflect  
5                                higher reliability of said network element.

1        58. The computer program product of claim 57, wherein said set of  
2 instructions is further configured to:

3                if said value of said reliability count is a maximum value,  
4                        move said address of said network element from said dampening list to  
5                                said neighbor pending list.

1        59. The computer program product of claim 58, wherein said maximum  
2 value is predetermined.

1        60. The computer program product of claim 58, wherein said maximum  
2 value is dynamically adjusted according to a traffic condition in said network.

1        61. The computer program product of claim 56, wherein said set of  
2 instructions is further configured to:

3                if said network element is not in said dampening list,  
4                        add said address of said network element to said dampening list, and  
5                                set said value of said reliability count of said network element to said  
6                                        maximum value.

1       62. The computer program product of claim 61, wherein said set of  
2 instructions is further configured to:

3           set said neighbor hold count for said network element; and  
4           send a second unreliable packet to said network element.

1       63. The computer program product of claim 51, wherein said set of  
2 instructions is further configured to:

3           initiate a neighbor pending timer.

1       64. The computer program product of claim 62, wherein said set of  
2 instructions is further configured to:

3           if said acknowledgement to said reliable packet is not received before said  
4           neighbor pending timer expires,  
5           remove said address of said network element from said neighbor  
6           pending list, and  
7           update said value of said reliability count to reflect lower reliability of  
8           said network element.

1       65. The computer program product of claim 62, wherein said set of  
2 instructions is further configured to:

3           if said acknowledgement to said reliable packet is received before said  
4           neighbor pending timer expires,  
5           move said address of said network element from said neighbor pending  
6           list to said neighbor list, and  
7           remove said address of said network element from said dampening list.